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Despite conflicting strategies for shifts in decision-making power in educating and licensing teachers, various studies of teacher education agree on the need for experimentation in teacher education and uncertainty with respect to what knowledge is most pertinent to the professional preparation of teachers. Newer developments in the systematic study of teaching represent points on a continuum starting with purely descriptive studies of teaching but advancing to controlled investigations which yield broad generalizations. A proposal for utilizing present descriptive studies of teaching for improving teacher education merits attention; it suggests that teacher candidates emulate the mode of inquiry of researchers in a clinical approach to direct study of ongoing teaching. Examination of the general nature of scientific theory suggests the possible anatomy of a theory of teaching. Controlled investigations of teaching subsequently will yield broad, predictive generalizations which will be fashioned into multiple theories to constitute a corpus of knowledge with demonstrable power to describe, explain, and control various dimensions of teaching. Such knowledge may clarify the points of convergence and relevance of ancillary disciplines like psychology, sociology, and philosophy to the educational process. Such knowledge ultimately will become the principal substantive content of the professional education of teachers. (A 14-item bibliography is appended.) (Author/SG)

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STUDIES OF TEACHING AND THEIR IMPACT ON FUTURE DEVELOPMENTS IN TEACHER EDUCATION*

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The 1960's and perhaps the 1970's in the history of American teacher education probably will be remembered as decades of intensified examination, criticism, and experimentation. The criticisms of teacher education along with recommendations for its improvement have emerged from various organizations and individuals--including educationists involved in teacher preparation. Debates on how best to prepare teachers are now given full-blown national attention, and diverse solutions have been presented. The rather bewildering array of recommendations for the improvement of teacher education often displays a combination of thoughtful opinion, reflection on experience, generous application of value judgments, and considerable speculation. This paper is in keeping with such contemporary approaches in formulating suggestions toward the improvement of teacher education.

Uncertainty of Knowledge and Curriculum Most Pertinent to Teacher Education

Several of the major studies aimed at the re-examination of teacher education that have gained some national attention appear to carry a similar theme despite their varied, and occasionally conflicting, recommendations. This permeating theme is one which expresses uncertainty about what knowledge and curricular organization are necessary to the professional education of teachers. However, even the most critical of the following studies concedes the desirability of some specialized or professional preparation for prospective teachers.

One major study resulted from the deliberations of several committees working as a "task force" for the NEA's National Commission on Teacher Education and Professional Standards. The final report of the task force, New Horizons for the Teaching Profession, offered a rather comprehensive series of recommendations for improving the present status of American teacher education. The recommendations ranged from those dealing with the development and enforcement of professional standards for teachers to suggested guidelines for assuring quality in teacher preparation programs. Furthermore, the recommendations were designed with sufficient flexibility to permit and encourage considerable autonomy and experimentation within institutions preparing teachers.

It would be less than candid not to recognize that the report failed to receive the kind of national attention and careful consideration hoped

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for. Hailed by some as a far-ranged plan for self-discipline of the teaching profession, the report was curtly dismissed by others. Because the central thesis of the report was one of professional autonomy and self-regulation in teacher education and certification, the recommendations were severely criticized as perpetuating a monolith or the so-called "education establishment." An inherent dilemma of the New Horizons report was its insistence of careful evaluation according to standards and its concurrent recognition of the need for a comprehensive definition of teacher competence, "...in order to validate key professional procedures such as teacher selection, preparation, and licensure."[1/]

The Conant report on teacher education represents a sharp disagreement with the New Horizons report and its proposals for professional autonomy with leadership exerted by the NEA. While his suggested programs for the preparation of elementary- and secondary-school teachers include certain education courses as desirable, Conant's recommendations are deliberately designed to promote freedom of experimentation in teacher education. Indeed, Conant characterizes his recommendations with the words "freedom" and "responsibility." Only student teaching should serve as a stipulated certification requirement for future teachers in each state, according to Conant. It is Conant's assumption that free but responsible institutional competition in teacher education programs will cause academic professors and education professions "...to join hands to enhance the reputation of their particular institution."[2/] "Clinical professors" would be given the formidable task of assessing the relevance and value of various aspects of the total collegiate curriculum to students' teaching performances in student teaching. The heart of Conant's recommendations is his recognition that "How best can we prepare teachers?" is an open, empirical question. This recognition, in turn, follows his conclusion that

> Professors of education have not yet discovered or agreed upon a common body of knowledge that they feel should be held by school teachers before the student takes his first full-time job.[3/]

Perhaps the most sarcastic critique of teacher education and of educationists in general has been James Koerner's The Miseducation of American Teachers. Koerner states that his book is like others in education with respect to expressing a point of view, and he admits that the book is "...filled

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1/ Margaret Lindsey, (Ed.). New Horizons for the Teaching Profession: A Report of the Task Force on New Horizons in Teacher Education and Professional Standards. Washington, D.C.: National Commission on Teacher Education and Professional Standards, National Education Association, 1961. p. 226.

2/ James B. Conant, The Education of American Teachers. New York: McGraw-Hill Book Company, Inc., 1963. p. 217.

3/ Ibid., p. 141.

with judgments, private evaluations, even prejudices if you like...."[4] He adds to this frank prelude the admission of genuine, although far from spectacular, efforts within the field of education for internal improvement. However, his general conclusions about present programs and his recommendations for improving the future preparation of both common school teachers and educationists reflect rather harsh indignation and pessimism. Among Koerner's major "findings" cited in numerous places throughout his book and certainly underlying most of his thirteen recommendations for improving teacher education is the following:

> Education as an academic discipline has poor credentials. Relying on other fields, especially psychology for its principal substance, it has not yet developed a corpus of knowledge and technique of sufficient scope and power to warrant the field's being given full academic status.[5]

A fourth and final study used here to reinforce my initial point is one which grew out of a conference devoted to a reappraisal of teacher education. The conference was sponsored by the Fund for the Advancement of Education, and it was held at the Center for Advanced Study in the Behavioral Sciences in the summer of 1960. Conference participants consisted largely of persons who had been actively involved in teacher education projects sponsored by the Fund.

While a summary of the conference included eleven critical charges directed at professional aspects of teacher education, the conferees agreed on the following points:

> Teacher preparation ought to include, in addition to liberal education: (1) specialized knowledge of the subject to be taught, (2) professional knowledge, which includes understanding of the role of the school, contributions of the behavioral sciences, and an appreciation of the components of the educational process, (3) practice teaching - under apprenticeship or internship, but always under wise guidance and direction, and (4) unifying theory.[6]

In addition, four other major agreements or recommendations were given as the conference summary. These included: (1) devoting greater

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4/ James D. Koerner. The Miseducation of American Teachers. Boston: Houghton Mifflin Company, 1963. p. 4.

5/ Ibid., p. 17.

6/ Elmer R. Smith, (Ed.). A Re-Appraisal of the Professional Aspects of Teacher Education. Report of a Conference Sponsored by the Fund for the Advancement of Education at the Center for Advanced Study in the Behavioral Sciences, Palo Alto, California, June 22-August 20, 1960. Mimeographed prepublication copy, p. 15-16. Koerner directly quotes the critical charges made at the conference in his book.

attention to examining teaching acts as representative syntheses of knowledge, values, and instructional methods, (2) encouraging greater experimentation in various means of intellectual inquiry such as seminars and independent study as possible substitutes for formal courses, (3) exploring alternative and more flexible procedures and requirements for teacher certification, and (4) pursuing depth studies of the areas presumed to be essential to the professional education of teachers.[7] The last recommendation was also repeated in the summary of the conference as a critical charge against teacher education as follows: "...no respectable basis for professional education is likely to exist until studies in depth are undertaken by responsible scholars to validate content."[8]

Two of the studies cited involved the collaborative efforts and decisions of groups comprised largely of educationists in teacher education. On the other hand, the reports by Koerner and Conant could not be misinterpreted to reflect educationists' point of view if such point of view really exists. In fact, the pluralism, the self-criticism, and considerable experimentation that Conant is so desirous of encouraging in teacher education already exist despite various state certification requirements that he considers obsolete and excessively prescriptive. However, it would be naive not to recognize that the recommendations of the reports cited involve conflicting strategies for shifts in decision-making power relevant to the education and licensure of teachers. Apparently, the future of teaching as a profession is also viewed differently in the reports cited. But none of the reports expresses satisfaction with the present national status and nature of teacher education. All four reports suggest an experimental approach to improving the curricula of teacher education. And to put it diplomatically, each of the reports indicated concern and uncertainty with respect to what knowledge is most pertinent to the professional education of teachers.

The reports, of course, contained many other critical comments and suggestions with implications for the knowledge-organization dilemma of professional teacher education. A major recommendation of the New Horizons report was one for the development and implementation of research for the practitioner. The Fund-sponsored conference report along with Koerner lamented the lack of a "unified theory" for teacher education. While Koerner debunked what he considered rather pedestrian attempts at scientism in education, he insisted that education has failed to merit academic status because it lacks "...a body of knowledge of demonstrable power and a research methodology to support and expand it."[9] Conant, on the other hand, preferred not to entertain the possibilities of developing a "theoretical-deductive" approach to education which allegedly would yield broad, scientific generalization and theory. Instead, Conant critically examined the role of the various disciplines that are often considered foundational to educational practice.[10]

7/ Ibid., pp. 16-18.

8/ Ibid., p. 13.

9/ Koerner, Op. cit., p. 28.

10/ Conant, Op. cit., pp. 112-145.

These disciplines he viewed as analogous to sciences considered basic to medical practice but not as fully developed or apparently relevant to educational practice as those of the medical sciences are to medical practice.

Diverse Approaches to the Study of Teaching

Most educationists, I suspect, would agree that problems and acts of teaching are amenable to scientific study. The meaning of "scientific" as used in this paper shall be based upon Conant's own definition of science: "...an interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observation and are fruitful for further experimentation and observation."[11] Scientific study of teaching, then, would involve experimentation and observation of teaching that would yield an interconnected series of concepts and conceptual schemes.

However, there have been extremely varied attempts to study teaching. A substantial proportion of such past study has been directed at appraising teacher qualities or some aspect of teaching performance. Such studies have falled short of contributing broad, predictive generalizations about teaching. In the preface of a recently published book devoted to research on teaching effectiveness, the editors make the following statement:

> Few, if any facts are now deemed established about teacher effectiveness, and many former "findings" have been repudiated. It is not an exaggeration to say that we do not today know how to select, train for, encourage, or evaluate teacher effectiveness.[12]

In addition, there have been difficulties among researchers in determining what kinds of inquiry could be legitimately designated as research on teaching. For example, should studies of how teachers perform school duties outside of the classroom such as faculty committee participation or having conferences with parents constitute research on teaching? In reviewing plans that served to outline the prodigious Handbook of Research on Teaching, Gage reported the committee agreement that an investigation must deal with certain "central variables" in order to be considered research on teaching in the handbook. Three categories of such central variables were identified: (1) teaching methods, (2) instruments and media of teaching, and (3) the teacher's personality and characteristics. Gage also described variables often found in investigations that the handbook committee considered neither necessary nor sufficient as bases for qualifying a study as being one on teaching. These variables included social interaction and the social background of teaching. Other considerations such as subject matter and grade level could be held as constants or serve as key variables in research on teaching according to Gage.[13] This rather liberal delineation

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11/ James B. Conant. Science and Common Sense. New Haven: Yale University Press, 1951. p. 25.

12/ Bruce J. Biddle and William J. Ellena, (Editors). Contemporary Research on Teacher Effectiveness. New York: Holt, Rinehart and Winston, 1964. p. vi.

13/ N. L. Gage, (Ed.). Handbook of Research on Teaching. Chicago: Rand McNally & Company, 1963. from the preface.

of the nature of research on teaching at least narrowed the foci of such study to what the teacher does or uses in acts of teaching, or on teacher characteristics that may have relevance to teaching.

Even with the foregoing limits established to designate investigations as research in teaching, the phenomenon of teaching may be studied at different levels. Meux and Smith identify three such levels of inquiry: (1) a purely descriptive study of teaching, (2) a correlational study, and (3) a study designed to discover generalizations.[14] The first level of inquiry is one intending simply to describe the classify teaching behaviors so that the phenomenon of teaching can be better understood. Because the approach is purely descriptive in nature, it is a study in the sense of "natural history." The second level of study is one with the purpose of establishing correlations between certain designated variables relevant to the phenomenon under investigation. Such has been the principal approach to studies of teacher effectiveness previously mentioned. For example, pre- and post-test measures of students' results on achievement tests may be correlated with observer's judgments of certain teacher behaviors in the classroom. The last type of inquiry mentioned by Meux and Smith is essentially that of an experimental study specifically designed to discover cause-effect relationships or broad, predictive generalizations within the phenomenon.

Smith, Meux, and others serving as research collaborators are convinced that descriptive studies represent the most fruitful approach to investigating teaching at the present time. The primary reason for this conclusion, according to these researchers, is because so little is known about the nature of teaching to warrant the use of the other research approaches identified. Realizing that such descriptive studies are often dismissed as unimportant, Smith offers the following justification for them:

> If very little is known about a phenomenon, the way to begin an investigation of it is to observe and analyze the phenomenon itself. It must be observed, analyzed, and classified into its various elements. Until the factors which are involved in the phenomenon are understood and described, there is little likelihood that significant correlational, predictive, or causal studies can be made. In other words, the state of knowledge about a given phenomenon dictates to some extent the kind of inquiry of it which is appropriate. A justification of a descriptive study of teaching is that it is preliminary to experimental investigation of the phenomenon itself.[15]

14/ Milton Meux and B. Othanel Smith, "Logical Dimensions of Teaching," from Biddle and Ellena, op. cit., p. 128.

15/ B. Othanel Smith and Milton O. Meux, in collaboration with Jerrold Coombs, Daniel Eierdam, and Ronald Szoke. A Study of the Logic of Teaching. Urbana, Illinois: Bureau of Educational Research, College of Education, University of Illinois, 1963. p. 8.

Parenthetically, it would be reasonable to infer that these researchers regard the use of the other two levels of inquiry for past studies of teaching as premature, thereby casting considerable doubt upon the validity of any findings resulting from such studies.

Apparently, there are no studies of teaching at the present that will yield the broad, predictive generalizations that are a long-range goal of inquiry into teaching. Descriptive studies of teaching, however, serve as essential prerequisities to subsequent investigations which may yield such generalizations. For the researcher, this is the primary role of such studies. If such descriptive studies provide various means of understanding the complex phenomenon of teaching, then such studies are important in their own right. But in addition, such investigations may provide possibilities for the improvement of teacher education.

A Proposal for Improving Teacher Education

A wide range of implications for teacher education may be drawn from descriptive studies of teaching. No attempt will be made to explore the variety of such possibilities. Instead, a general proposal for using such investigations of teaching will be presented and examined because of its promising potential. This proposal is one which has been advanced by Waimon. The details of his proposal are described elsewhere; therefore only the basic ideas and rationale are presented here.16/

Recognizing the importance of the newer descriptive studies of teaching, Waimon proposes that professional teacher education involve prospective teachers emulating the mode of inquiry of such researchers. Rather than using the data of such inquiry, Waimon sees greater value in using the methodology for improving teacher education at present. In essence, he envisions prospective teachers investigating and analyzing ongoing acts of teaching by systematic research procedures as the central focus of their professional education.

Generalizing from his analysis of the procedures employed by the researchers, Waimon suggests that teacher candidates utilize laboratory experiences by studying teaching somewhat as follows: (1) develop a working concept of teaching, (2) observe and record behavior in ongoing classrooms, (3) analyze the recorded data, and (4) draw inferences from the data and formulate generalizations about the teaching-learning process. Such direct study of teaching by prospective teachers, Waimon assumes, would display certain critical advantages. Among the advantages claimed are that such studies would be meaningful and functional to teacher candidates because of their direct relevance to teaching. In addition, such studies would facilitate synthesis of content from various fields for focus upon teaching. Finally, Waimon believes that such an approach would be valuable because it would stress general principles of teaching and continuous inquiry into the nature of teaching.

16/ Morton Waimon, "The Nature of Teaching: Implications for Teacher Education," Concern for the Individual in Student Teaching, Association for Student Teaching, 42nd Yearbook. Dubuque, Iowa: Wm. C. Brown Co., Inc., 1963. pp. 79-97.

While the foregoing proposal offers exciting possibilities for experimentation in teacher education, certain precautions should be considered. Descriptive studies of teaching serve only to develop classifications of teaching behavior for greater understanding of the phenomenon. This type of research is not designed to discover cause-effect relationships or predictive generalizations about teaching. Having prospective teachers utilize such a methodological approach in their own study of ongoing teaching should enable them to learn how to classify and perhaps better understand teaching acts. The research procedures and their findings, however, do not provide teacher candidates with principles or generalizations about teaching which are useful in the control and resolution of teaching problems. Principles or hypotheses for coping with instructional problems must come from other sources and by other means than descriptive study of teaching.

A second possible limitation to the proposal is one centering on the readiness of teacher candidates for the learning experience. The researchers have developed such inquiry as a result of certain backgrounds of knowledge, perhaps past failures, some speculative hunches, and a host of other conditions that prospective teachers do not bring to the learning situation. In the attempt to have the teacher candidates engage in genuine intellectual inquiry comparable to the researchers, inadvertently they may simply be trained to learn how to classify teacher behaviors reliably, how to use observation guides efficiently, or whatever the methodological approach demands. Unintentionally, we might be preparing useful graduate assistants but not necessarily better teachers.

A third possible limitation relates to the nature of the research being used as the model for teacher candidate inquiry. Descriptive studies of teaching deal with or focus upon selected dimensions of teaching. The study of B. O. Smith and his associates, for example, centers upon the logical nature of teachers' verbal behavior. Furthermore, because such studies have little precedent, the attempts at classification and understanding of teacher behavior are rather primitive. Teacher candidates employing such research schema should recognize the status of the inquiry so that it is not misinterpreted as a comprehensive explanation of teaching. Unless this is done, intellectual closure rather than a spirit of continued, open inquiry might be the end result.

Despite the limitations described, the proposal offers dramatic possibilities for experimentation. Essentially, Waimon would like to have prospective teachers engage in the clinical study of teaching itself. Such study could be at once rigorous, systematic, and directly relevant to their own subsequent roles as practitioners in the classrooms. Teacher candidate involvement in systems of direct study of teaching has been suggested by others also. After discussing his own system of classroom interaction analysis, Flanders states:

> Perhaps this is the point to risk a prediction, which is that teacher education will become increasingly concerned with the process of teaching itself during the next few decades. Instead of emphasizing knowledge which <u>we think</u> teachers will

> need in order to teach effectively, as we have in the past, we will turn more and more to an analysis of teaching acts as they occur in spontaneous classroom interaction.[17]

Using descriptive studies as the basis for a clinical approach to the study of teaching could have an important impact upon teacher education. The intent and value of the proposal by Waimon is that it might help teacher candidates learn how to make wiser decisions and more fruitful hypotheses toward the solution of instructional problems. Becoming diagnosticians of their students' learning problems while monitoring their own teaching acts is an important behavioral goal for prospective teachers. This kind of an approach in teacher education may be somewhat analogous to the earlier case study approaches to the study of law and business. According to Conant, the case study was a revolutionary pedagogical device in law and business which stressed the "empirical-inductive mode of thought."[18] Perhaps the clinical study of teaching will make an impact upon teacher education comparable to that of the case study approach upon business and law education.

However, descriptive studies of teaching and their use by prospective teachers would represent only one side of the coin in teacher education improvement. Descriptive studies, as mentioned previously, are merely preliminary to further investigations of which the goal is discovery of broad, predictive generalizations. Such broad generalizations could then lead to theories of teaching. Theories of teaching, in turn, could offer additional possibilities for the improvement of teacher education.

Theories of Teaching

As indicated in sources mentioned previously in this paper, educational literature often contains pleas for a "unified theory" or a "unified theory of teacher education." It is difficult to determine what is meant or requested by such pleas. I suppose that the demand for a "unified theory of teacher education" is primarily a concern regarding discerned disjointedness in programs for educating prospective teachers. Calling for a unified theory of teacher education then is largely requesting that a more coherent pattern of teacher education be established with clear relationships of goals, content, procedures, and general organization given in such plan.

Demands for a "unified theory" are somewhat more bewildering. Does such a request suggest the necessity or desirability of incorporating all activities, content, and research of the total educational enterprise into one gigantic, logically constructed explanation of the enterprise? If so, the suggestion is unrealistic. It is inconceivable, for example, that all of the diverse aspects of the social sciences be subsumed in a mono-

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17/ Ned A. Flanders, "Intent, Action, and Feedback: A Preparation for Teaching," Journal of Teacher Education. XIV:3, September, 1963. p. 260.

18/ James Bryant Conant. Two Modes of Thought. New York: Trident Press, 1964. pp. 46-65.

lithic, comprehensive explanation of man's social environment. Why should we assume that such an explanation is possible for the diverse areas that comprise education? On the other hand, perhaps such a request suggests the possibility of a comprehensive explanation of teaching. Even a more modest expectation such as this is unlikely to materialize. It is more likely that various theories of teaching will emerge in the future rather than a single theory which will explain all forms of teaching regardless of differences in the content, teaching goals, kinds of activities, and the like.

Of course, there are legitimate doubts even as to whether various theories can be developed with power to explain only limited forms of teaching. To Conant, the most promising contribution to the emphasis of a theoretical-deductive approach in education lies with further developments in experimental psychology.19/ In other words, Conant sees the possibility of certain educational sciences (primarily psychology) developing broad generalizations and theory from which controls or diagnoses of the teaching-learning process may be made. Conant has not considered the possibility of deriving theories of teaching from the study of teaching itself. However, he warns against misconstruing research which simply piles up narrow generalizations as contributing to wide scientific principles and theory.20/ Additional doubts are expressed in Nagel's analysis of methodological problems in the social sciences:

> Many social scientists are of the opinion, moreover, that the time is not yet ripe even for theories designed to explain systematically only quite limited ranges of social phenomena.21/

Nagel further reviews methodological problems in the social sciences and points out the questionable validity as well as limited nature of the theoretical explanations which have been produced. However, his analysis concludes with the conservative observation that "...none of the methodological difficulties often alleged to confront the search for systematic explanation of social phenomena is unique to the social sciences or is inherently insuperable."22/

If the emergence of various theories of teaching is possible even for explaining limited forms of teaching, how shall such theories be constructed? Perhaps at this point it would be helpful to examine the general nature of scientific theory. According to Brodbeck, a scientific theory is a deductively connected set of laws. A theory is dependent upon having a series of broad generalizations about the phenomenon in question. Furthermore, the generalizations must be related to each other in a coherent pat-

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19/ Ibid., p. 89.

20/ Ibid., pp. 16-17.

21/ Ernest Nagel. The Structure of Science. New York: Harcourt, Brace and World, Inc., 1961. p. 448.

22/ Ibid., p. 503.

tern or system. Generalizations are also called general facts, laws, or hypotheses. A scientific theory, then, is comprised of general facts, laws, or hypotheses related to each other in a systematic, noncontradictory order. Within the theory, each generalization states how something is lawfully connected with something else. Therefore, the theory describes and explains the phenomenon to which it is addressed. The theory also serves as a means of predicting certain consequences in the phenomenon in view of certain given antecedents. The theory may be considered a huge, internally consistent, if-then statement.23/

In a paper devoted to her inquiry into the nature of teaching, Maccia describes three characteristics necessary for a scientific theory. These characteristics plus a terse explanation for each are as follows: (1) formal coherence--i.e., systematic relationship of the statements which comprise the theory, (2) observational verification--i.e., correspondence of statements of theory to that which can be experienced, and (3) observational predictiveness--i.e., derivation of statements from the theory about what will happen in experience.24/

The foregoing sketchy anatomy of scientific theory borrowed freely from Brodbeck and Maccia offers clues as to the structure of future theories of teaching. It also helps clarify the nature of present descriptive studies of teaching. Attempting to develop desscriptive classifications rather than correlational or causal data, the researcher in such study may identify a series of behaviors exhibiting common characteristics. He then may group such behaviors in one category because of their common characteristics. The category may be designated by some term with appropriate connotations such as "opining, integrative, or controlling" as has been the case in such studies. The researcher may have as many of these categories as he deems necessary to handle his data. Such categories and their identification labels designating the set of characteristics or descriptive features are the concepts invented by the researcher.

Concepts are the "stuff" which generally distinguish one field of knowledge from another. The concepts emerging from purely descriptive studies of teaching, however, may be short lived. Concepts may be analyzed with respect to their meaningfulness and significance, according to Brodbeck. Concepts are said to be meaningful if they are sufficiently defined in terms of the observable characteristics or descriptive features which they designate. Concepts are significant only when they are connected with other concepts, that is, when they enter into generalizations or laws.25/ Since the discovery of connections between concepts is not the intent of descriptive studies of teaching, the significance of concepts resulting from such studies is dependent upon subsequent investigations.

23/ May Brodbeck, "Logic and Scientific Method in Research on Teaching," in, N. L. Gage (Ed.), Op. cit., pp. 68-69.

24/ Elizabeth Steiner Maccia, "Instruction as Influence Toward Rule-Governed Behavior." A paper presented to the Ninth ASCD Curriculum Research Institute, Eastern Section, Washington, D. C., March 2, 1964 (mimeographed). p. 2.

25/ Brodbeck, op. cit., pp. 56-57.

Concept connections or laws or generalizations or if-then causal statements are the basic fabric of theories. Controlled investigations rather than descriptive studies of teaching may yield such generalizations. However, investigations themselves will not yield theories of teaching. Theories of teaching are dependent upon the background of knowledge, the ingenuity, and the insights of the person or persons who fashion them. The broad, predictive generalizations resulting from controlled investigation of teaching must be organized in some logical structure by the theorists. The theories as well as their component generalizations are always subject to further investigation, refinement, and possible invalidation. One of their principal functions is to generate further investigation.

Multiple theories of teaching will result from the efforts of the researchers and theorists in education as they turn more of their attention to the examination of teaching itself. Each theory of teaching will offer explanations for limited aspects of teaching. The particular nature of such theories and the aspects of teaching they will explain are matters of conjecture. Variations in theories might depend upon the nature of subject matter in question or upon the particular kind of children to be taught. For purposes of illustration, Gage identified four categories of specification for such diverse theory development. These included the possible development of different theories for: (1) types of teacher activities, (2) types of educational objective, (3) components of the learning process, and (4) families of learning theory.[26]

Bruner has argued for the necessity of a theory of instruction also. Whether he sees the emergence of multiple instructional theories can only be inferred from his writings. However, he seems to suggest the addition of another dimension to such theories. He would not be satisfied with instructional theories which, like learning theories, provide after-the-fact description of the phenomenon. He insists that such theories be prescriptive and normative in nature. Or, to put it in his own words, "A theory of instruction, in short, is concerned with how best to learn what onewishes to teach, with improving, rather than describing learning."[27] Bruner further insists that such theories involve a congruence of learning theory, developmental theory, and knowledge of the subject matter. He probably would not settle for less than a multi-disciplinary convergence of knowledge upon the solution of instructional problems and curriculum improvement. The convergence of learning theories and knowledge of developmental psychology with knowledge about the nature of teaching, however, is dependent upon investigation of teaching. That is, the relevance and points of convergence of such knowledge to teaching are indeterminate since inadequate knowledge exists about the phenomenon of teaching itself. It appears that Bruner would like an instructional theory subsumed as an integral part of a theory of curriculum. Thus, the approach would be a grand strategy for

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26/ N. L. Gage, "Theories of Teaching," in Ernest R. Hilgard, (Ed.). Theories of Learning and Instruction. 63rd Yearbook, National Society for the Study of Education, Part 1. Chicago: University of Chicago Press, 1964. pp. 275-281.

27/ Jerome S. Bruner, "Some Theories on Instruction Illustrated With Reference to Mathematics," in Ernest R. Hilgard, Ibid., p. 307.

improving the teaching-learning process in all phases of the curriculum. The proposal of Bruner may represent an ideal which is as difficult to dismiss as it is to attain. In the long run, perhaps we cannot settle for anything short of such an ideal.

Nevertheless, the development of multiple theories of teaching will have significant impact upon teacher education and the enterprise of education in general. Such theories will result from systematic inquiry and processes of validation. The theories will be comprised of related generalizations of a broad, predictive nature. The concepts, generalizations, and theories will constitute a corpus of knowledge with demonstrable power to describe, explain, and control various dimensions of teaching. Such knowledge ultimately will become the principal substantive content of the professional aspect of teacher education. Such knowledge also will provide greater clarification of the points of convergence and relevance of ancillary disciplines like psychology, sociology, and philosophy to the educational process.

From such theories, education will then have developed its own modes of inquiry, a system of interconnected concepts and conceptual schemes, and fundamental bases to guide practice as well as further investigations. In short, education will assume the characteristics of a discipline in its own right, but a descipline inextricably tied to the improvement of practice in its enterprise. The future of teacher education may well reside with the nature of such theories, the knowledge which they represent, and how wisely those of us in teacher education can put such knowledge to use.

Summary

Despite conflicting strategies for shifts in decision-making power relevant to the education and licensure of teachers, various studies of teacher education show certain areas of agreement. The need for experimentation in teacher education and uncertainty with respect to what knowledge is most pertinent to the professional preparation of teachers are among such areas.

Newer developments in the systematic study of teaching have emerged in the past decade. Such systematic studies represent points on a continuum starting with purely descriptive studies of teaching but advancing to controlled investigations which yield broad generalizations about the phenomenon. A proposal for utilizing present descriptive studies of teaching for improving teacher education merits attention. Essentially, the proposal suggests that teacher candidates emulate the mode of inquiry of the researchers in a clinical approach to direct study of ongoing teaching. The proposal may be somewhat analogous to the case study approach which had considerable impact upon improving business and law curricula.

The general nature of scientific theory was examined to suggest the possible anatomy of a theory of teaching. It was argued that controlled investigations of teaching subsequently will yield broad, predictive generalizations. Such generalizations will be fashioned into multiple theories, rather than a single, comprehensive theory of teaching. Each theory of teaching will be relevant to limited aspects of teaching. The generalizations and theories will constitute a corpus of knowledge with demonstrable

power to describe, explain, and control various dimensions of teaching. Such knowledge may offer clarification of the points of convergence and relevance of ancillary disciplines like psychology, sociology, and philosophy to the educational process. Such knowledge ultimately will become the principal substantive content of the professional education of teachers.

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